

# BOXER-6403

## Reliability Prediction Report

### (MTBF)

Summary	Failure Rate: 10626.825587 ppm MTBF: 94,101 Hours
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Issue date

2015/03/30

Approval

KJ Wang

Test Engineer

Leo Liu

# Reliability Prediction (MTBF)

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**I . Model Name: BOXER-6403**

**II . Prediction Date: March. 30, 2015**

**III . Prediction Site: AAEON Q.E. Dept.**

**IV . Predicted by: Leo Liu**

**V . Equipment: Windchill Quality Solutions 10.1**

**VI. Simulation Environment:**

- Temperature: 30 degrees C
- Standard: Telcordia (Bellcore) Standard

**VII. Term and Definition:**

- Unit : An assembly of device.
- Duty Cycle : Used to specify the percentage of time that the element is in an on state, and it is equal to the percentage of total time the item is in the active environment.
- Quantity : The quantity of the selected item.
- Failure Rate : Used to specify that the failure rate is to be calculated based the selected Calculation models. The Failure rate multiplier is 1000000000.
- MTBF : MTBF is always specified in hours.

**VIII. Prediction Result:**

BOXER-6403 (9697BT0117-D):

- Failure Rate: 10626.825587 ppm
- MTBF: 94,101 Hours

**AAEON Reliability Prediction  
Summary**

**File Name:** BOXER-6403.rfp  
**Duty Cycle:** 100  
**Calculation Model:** Telcordia Issue 2  
**Method:** Method I Case 3

**Failure Rate:** 10626.825587  
**MTBF (hrs):** 94,101  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Assembly Name	Part Number	Ref Des	Quantity	Failure Rate	MTBF
BOXER-6403	System		1	10626.825587	94,101

**File Name:** BOXER-6403.rfp  
**Assembly:** System  
**Ref Des:**  
**Description:**

**Failure Rate:** 10626.825587  
**MTBF (hrs):** 94,101  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1050501234	Resistor	R33		2.547039	1	282340674.079668
1050501834	Resistor	R339		2.547039	1	282340674.079668
1050502004	Resistor	R465,R467		2.547039	2	154078778.388085
1050502734	Resistor	R477		2.547039	1	282340674.079668
1050503334	Resistor	R321		2.547039	1	282340674.079668
1050503634	Resistor	R290		2.547039	1	282340674.079668
1050503934	Resistor	R182		2.547039	1	282340674.079668
1050504724	Resistor	R214,R215,R403, R404,R417,R422, R506		2.547039	7	48991237.965885
1050505134	Resistor	R293		2.547039	1	282340674.079668
1050505633	Resistor	R370		2.547039	1	282340674.079668
1050506224	Resistor	R317		2.547039	1	282340674.079668
1050507530	Resistor	R315,R369		2.547039	2	154078778.388085
1050510034	Resistor	R190,R216,R217, R236,R598		2.547039	5	67008142.102588
1050512104	Resistor	R347		2.547039	1	282340674.079668
1050512414	Resistor	R135		2.547039	1	282340674.079668
1050513724	Resistor	R292		2.547039	1	282340674.079668
1050515034	Resistor	R363,R371		2.547039	2	154078778.388085
1050516034	Resistor	R326		2.547039	1	282340674.079668
1050516204	Resistor	R188		2.547039	1	282340674.079668
1050516934	Resistor	R657		2.547039	1	282340674.079668
1050516964	Resistor	R466		2.547039	1	282340674.079668
1050520034	Resistor	R400,R428,R429		2.547039	3	107020754.986850
1050521024	Resistor	R338		2.547039	1	282340674.079668
1050523264	Resistor	R186		2.547039	1	282340674.079668
1050525504	Resistor	R682,R686		2.547039	2	154078778.388085
1050527424	Resistor	R395		2.547039	1	282340674.079668
1050529464	Resistor	R187		2.547039	1	282340674.079668
1050530124	Resistor	R396		2.547039	1	282340674.079668
1050540204	Resistor	R209,R254,R282		2.547039	3	107020754.986850
1050540214	Resistor	R178		2.547039	1	282340674.079668
1050545364	Resistor	R56,R78		2.547039	2	154078778.388085
1050547564	Resistor	R177		2.547039	1	282340674.079668
1050564914	Resistor	R139		2.547039	1	282340674.079668
1050573264	Resistor	R348,R350,R356		2.547039	3	107020754.986850
1050584524	Resistor	R327		2.547039	1	282340674.079668
1050586614	Resistor	R96		2.547039	1	282340674.079668
1050700002	Resistor	R298,R418,R475		2.547039	3	107020754.986850

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1052768006	Resistor	R673,R675,R677, R679		2.547039	4	82309758.689546
1059520001	Resistor	R362		2.547039	1	282340674.079668
1059700001	Resistor	R426,R514,R680		2.547039	3	107020754.986850
1059700131	Resistor	R681,R685		2.547039	2	154078778.388085
1059710001	Resistor	R665		2.547039	1	282340674.079668
105A500103	Resistor	R256,R260,R359, R360		2.547039	4	82309758.689546
105A500139	Resistor	R100,R101,R180, R413,R415,R512, R613		2.547039	7	48991237.965885
105A500173	Resistor	R112,R146,R200, R208,R212,R213, R223,R225,R226, R227,R229,R230, R242,R243,R257, R268,R288,R305, R563,R614,R634,R67, R76,R77,R92, R93		2.547039	26	14061076.827148
105A500239	Resistor	R505		2.547039	1	282340674.079668
105A501003	Resistor	R592,R651		2.547039	2	154078778.388085
105A501039	Resistor	R10,R11,R12, R13, R196,R494,R495, R499,R501,R529, R535,R615,R616		2.547039	13	27342571.921361
105A501333	Resistor	R310		2.547039	1	282340674.079668
105A501539	Resistor	R478		2.547039	1	282340674.079668
105A502039	Resistor	R311,R313,R437, R509,R515		2.547039	5	67008142.102588
105A503039	Resistor	R173,R306,R312, R438		2.547039	4	82309758.689546

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105A503309	Resistor	R502,R508,R511, R516,R517,R518, R524,R539,R624, R625,R626,R627, R628,R629,R630, R631		2.547039	16	22425139.809646
105A505109	Resistor	R105,R129,R85,R86, R99		2.547039	5	67008142.102588
105A509133	Resistor	R640		2.547039	1	282340674.079668
105A510009	Resistor	R114,R144,R235, R323		2.547039	4	82309758.689546
105A510723	Resistor	R73		2.547039	1	282340674.079668
105A515009	Resistor	R158		2.547039	1	282340674.079668
105A515034	Resistor	R659		2.547039	1	282340674.079668
105A518723	Resistor	R322,R387		2.547039	2	154078778.388085
105A529429	Resistor	R308		2.547039	1	282340674.079668
105A531623	Resistor	R116,R87		2.547039	2	154078778.388085
105A533269	Resistor	R358		2.547039	1	282340674.079668
105A536503	Resistor	R337		2.547039	1	282340674.079668
105A540233	Resistor	R320		2.547039	1	282340674.079668
105A543033	Resistor	R364		2.547039	1	282340674.079668
105A544223	Resistor	R138		2.547039	1	282340674.079668
105A547003	Resistor	R349,R351		2.547039	2	154078778.388085
105A549919	Resistor	R35,R572		2.547039	2	154078778.388085
105A549969	Resistor	R137,R258,R272, R275,R276		2.547039	5	67008142.102588
105A561909	Resistor	R17,R18,R19, R20,R6, R7,R8,R9		2.547039	8	43225424.698300
105A564933	Resistor	R384		2.547039	1	282340674.079668
105A578713	Resistor	R368		2.547039	1	282340674.079668
105A578733	Resistor	R314		2.547039	1	282340674.079668

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105A700003	Resistor	R108,R174,R185, R253,R259,R265, R278,R316,R335, R361,R481,R492, R507,R510,R513, R534,R574,R582, R599,R663,R705, R706,R72,R75		2.547039	24	15190138.820515
105A700009	Resistor	R103,R106,R113, R120,R141,R143,R15, R16,R161,R162,R163, R164,R171,R172, R176,R179,R183, R189,R199,R201, R204,R210,R211, R220,R237,R238, R269,R270,R281, R284,R29,R296,R30, R301,R302,R303, R318,R319,R328, R336,R340,R341, R342,R357,R366, R367,R37,R382,R383,		2.547039	99	3821035.116675
105A700139	Resistor	R228,R353,R424, R483,R523,R585, R655		2.547039	7	48991237.965885
105A700239	Resistor	R670,R674,R676, R678		2.547039	4	82309758.689546



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105A701039	Resistor	R104,R111,R118, R119,R121,R147, R148,R149,R150, R151,R152,R153, R165,R175,R193, R205,R218,R22, R23,R231,R232,R24, R244, R247,R248,R25, R250, R251,R26,R261, R263, R273,R279,R28, R280, R286,R289,R294, R295,R304,R31, R324, R329,R332,R333, R34, R344,R352,R354, R36,		2.547039	112	3384913.455750
105A701059	Resistor	R3,R334,R46, R519, R527		2.547039	5	67008142.102588
105A701069	Resistor	R468		2.547039	1	282340674.079668
105A702039	Resistor	R117,R447,R448		2.547039	3	107020754.986850
105A702229	Resistor	R142,R202,R393, R399,R43,R430, R431, R452,R453,R454, R573,R635,R636, R641,R643,R68, R79, R82		2.547039	18	20032117.836120
105A702263	Resistor	R667		2.547039	1	282340674.079668
105A703309	Resistor	R38,R40,R55, R5, R611, R637,R638		2.547039	6	56573956.677649

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105A703329	Resistor	R110,R160,R168, R169,R170,R446, R457,R487,R488, R489		2.547039	10	35079934.879747
105A703363	Resistor	R482		2.547039	1	282340674.079668
105A704729	Resistor	R1,R115,R2,R266, R27,R460,R504,R533, R538,R567,R578, R633,R80		2.547039	13	27342571.921361
105A708229	Resistor	R53,R83		2.547039	2	154078778.388085
105A710009	Resistor	R355		2.547039	1	282340674.079668
105A710039	Resistor	R122,R125,R127, R128,R130,R14,R166, R192,R274,R325, R343,R374,R389, R394,R434,R436, R463,R476,R485,R49, R543,R581,R583, R622,R64,R66,R88		2.547039	27	13557741.157915
105A711033	Resistor	R309		2.547039	1	282340674.079668
105A720009	Resistor	R695,R696,R84		2.547039	3	107020754.986850
105A722009	Resistor	R167,R491		2.547039	2	154078778.388085
105A733009	Resistor	R107,R283,R398,R94		2.547039	4	82309758.689546
105A747009	Resistor	R102,R155,R191,R21, R373,R61,R63,R71, R89		2.547039	9	38754445.632391
106B510034	Resistor	RT1,RT2,RT3,RT4		7.724580	4	21923287.146155
1121415090	Capacitor	C207		1.128806	1	704977644.692287
1121501680	Capacitor	C254,C271,C272, C277		1.128806	4	196873384.410843

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1121501691	Capacitor	C10,C102,C103,C108,C109,C113,C114,C120,C122,C125,C127,C128,C13,C130,C134,C138,C14,C140,C141,C145,C146,C15,C152,C16,C17,C178,C179,C180,C181,C182,C183,C194,C2,C202,C21,C219,C224,C229,C23,C236,C239,C240,C242,C243,C244,C245,C25,C257,C259,C260,C26		1.128806	163	5330579.281770
1124410190	Capacitor	C246,C247,C248,C249,C250,C251,C252,C355,C434,C453,C454,C455,C456,C457,C458,C459		1.128806	16	52112480.802928
1124410191	Capacitor	C231,C232,C234		1.128806	3	257514172.353070
1124418090	Capacitor	C309,C318,C319,C340		1.128806	4	196873384.410843
1124427091	Capacitor	C20,C327,C364,C373,C396,C402		1.128806	6	133979725.056342
1124522280	Capacitor	C144,C149		1.128806	2	375289731.076049
1124533191	Capacitor	C186,C187		1.128806	2	375289731.076049
1124533282	Capacitor	C174		1.128806	1	704977644.692287
1124547190	Capacitor	C220,C227,C233,C351,C428,C450,C73		1.128806	7	115633865.771428

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1129522790	Capacitor	C422		1.128806	1	704977644.692287
1129622690	Capacitor	C106,C107,C133,C33,C37,C45		1.128806	6	133979725.056342
1129701791	Capacitor	C184,C265,C266,C267,C268,C290,C416,C42,C452,C489,C492,C61,C70,C81		1.128806	14	59316298.011235
1129710391	Capacitor	C185,C3,C376		1.128806	3	257514172.353070
118961018A	Capacitor	C12		4.744484	1	159663026.715137
1189615151	Capacitor	TC1		4.744484	1	159663026.715137
1189615154	Capacitor	C225,C226,C449,TC3,TC4		4.744484	5	36944177.000623
1189622154	Capacitor	C258,C99		4.744484	2	86049450.747498
1189633151	Capacitor	C313,C372,TC2		4.744484	3	59399119.141203
118C6331B0	Capacitor	C43,C461,C462,C467,C468,C469,C493		4.744484	7	26949727.707925
11C1501080	Capacitor	C123,C139,C151,C195		1.128806	4	196873384.410843
11C1539840	Capacitor	C129,C26		1.128806	2	375289731.076049
11C2610030	Capacitor	C1,C100,C131,C221,C228,C230,C349,C35,C350,C426,C444		1.128806	11	74892583.279796
11C4522290	Capacitor	C203,C204,C366,C368		1.128806	4	196873384.410843
11C4547190	Capacitor	C175,C209,C211,C212,C213,C214,C215		1.128806	7	115633865.771428
11E1510050	Capacitor	C201		1.128806	1	704977644.692287
11E1522680	Capacitor	C192,C193,C253,C269		1.128806	4	196873384.410843
11E1533780	Capacitor	C460		1.128806	1	704977644.692287
11E1622060	Capacitor	C197,C427,C55		1.128806	3	257514172.353070
11E1647090	Capacitor	C390		1.128806	1	704977644.692287
11E2501080	Capacitor	C377,C430		1.128806	2	375289731.076049

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11E2501690	Capacitor	C142,C155,C160,C210,C398,C408,C431,C432,C435,C466,C471,C472,C473,C488		1.128806	14	59316298.011235
11E2510010	Capacitor	C156,C159,C162,C198,C199,C438,C439,C482,C483,C484,C485,C486,C487		1.128806	13	63728475.410842
11E2522090	Capacitor	C479		1.128806	1	704977644.692287
11E4433090	Capacitor	C189,C235,C342		1.128806	3	257514172.353070
11E9501091	Capacitor	C101,C105,C110,C111,C112,C115,C116,C117,C118,C119,C121,C126,C135,C136,C137,C143,C148,C177,C18,C191,C196,C200,C22,C222,C264,C270,C280,C284,C292,C310,C32,C344,C361,C365,C419,C429,C470,C48,C480,C51,C54,C57,C62,C63,C66,C67,C69,C71,C72,C74,C75,C7		1.128806	64	13422762.501881
11E9510050	Capacitor	C223,C400		1.128806	2	375289731.076049
11E9522790	Capacitor	C190,C206,C369		1.128806	3	257514172.353070

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11E9547630	Capacitor	C44,C478,C68,C87		1.128806	4	196873384.410843
11E9547790	Capacitor	C420,C56		1.128806	2	375289731.076049
11E9610080	Capacitor	C237,C238,C255,C256,C261,C286,C287,C294,C300,C302,C304,C306,C31,C316,C325,C326,C339,C371,C374,C375,C388,C394,C399,C404,C409,C414,C448,C46,C52,C97		1.128806	30	28241202.507613
11E9622050	Capacitor	C132,C153,C154,C163,C164,C165,C166,C167,C168,C169,C170,C171,C172,C173,C19,C24,C27,C28,C412,C463,C464,C465,C49,C59,C94		1.128806	25	33748887.792763
11E9722090	Capacitor	C205		1.128806	1	704977644.692287
121110156W	Inductor	L3,L5		4.944252	2	83201062.149749
1211104270	Inductor	L8,L9		4.944252	2	83201062.149749
121112207J	Inductor	L2		4.944252	1	154760964.143460
121113307Q	Inductor	L4,L7		4.944252	2	83201062.149749
121114707L	Inductor	L6		4.944252	1	154760964.143460
1212306030	Inductor	FB1,FB12,FB13,FB14,FB3,FB4,FB5,FB6,FB7,FB8,FB9		4.944252	11	16872203.304846
1212308054	Inductor	FB2		4.944252	1	154760964.143460
12123A0009	Inductor	FB10,FB11		4.944252	2	83201062.149749
1214109000	Inductor	L1,L10,L17		4.944252	3	57363284.375370
1214309008	Inductor	CH1,CH2,CH3		4.944252	3	57363284.375370

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Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1214309009	Inductor	L11,L12,L13, L14, L15,L16		4.944252	6	30055900.223009
1231324056	Miscellaneous	Y3		19.200000	1	23844262.770939
123132505D	Miscellaneous	Y2,Y4,Y5		19.200000	3	5742504.738137
1231332726	Miscellaneous	Y1		19.200000	1	23844262.770939
12330024A1	Miscellaneous	Y6		19.200000	1	23844262.770939
1301075140	Semiconductor	D14,D15		7.793411	2	50578095.223398
1301400642	Semiconductor	D13,D7		7.793411	2	50578095.223398
1304001340	Semiconductor	D3		7.793411	1	92807310.010983
1304101340	Semiconductor	D4		7.793411	1	92807310.010983
1304300140	Semiconductor	D12,D5,D6		7.793411	3	35106858.962001
1305001540	Semiconductor	D19		7.793411	1	92807310.010983
1305080040	Semiconductor	D1,D10,D11, D17,D18, D2,D8,D9		7.793411	8	14161142.003130
1311390612	Semiconductor	Q8,Q9		22.463360	2	17315095.066101
131411171G	Semiconductor	U22		22.463360	1	31642600.748419
1315009080	Semiconductor	Q10,Q6,Q7		22.463360	3	12043329.789539
1315230511	Semiconductor	Q16		22.463360	1	31642600.748419
1315700216	Semiconductor	Q17,Q18,Q3 3,Q39, Q40		22.463360	5	7551839.591592
1315720010	Semiconductor	U50	48	71.077061	1	10000401.215500
1315720010	Semiconductor	Q15	50.3	74.522475	1	9538050.468701
1315971500	Semiconductor	U25,U59,U60 ,U61		22.463360	4	9270607.712006
1315D4C500	Semiconductor	Q26		22.463360	1	31642600.748419
1315EM6K10	Semiconductor	Q1,Q13,Q19, Q2,Q20, Q21,Q22,Q2 3,Q24, Q25,Q27,Q2 8,Q29,Q3, Q4,Q5		22.463360	16	2533798.883137
1430455200	Integrated Circuit	U10,U12,U13 ,U23,U4, U5,U7		43.803003	7	2408529.736257
1430973740	Integrated Circuit	U24	49.8	903.422188	1	569182.754392
143S596410	Integrated Circuit	U21		43.803003	1	11739202.588727
1440211AT0	Integrated Circuit	U16,U9		43.803003	2	6834791.244197
1440J19000	Integrated Circuit	U50	48	822.014746	1	625551.222309
14412F5080	Integrated Circuit			43.803003	1	11739202.588727
1470EL3H70	Integrated Circuit	U62,U63,U64 ,U65, U66,U67		43.803003	6	2750969.191556
1489GBT051	Integrated Circuit	U43		43.803003	1	11739202.588727
149TB01040	Integrated Circuit	U17,U36,U6		43.803003	3	4923240.069161
14S2432600	Integrated Circuit	U19		43.803003	1	11739202.588727

**File Name:** BOXER-6403.rfp  
**Assembly:** System  
**Ref Des:**  
**Description:**

**Failure Rate:** 10626.825587  
**MTBF (hrs):** 94,101  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
14S3104500	Integrated Circuit	U27,U28,U30,U31		43.803003	4	3879156.910661
14S3112300	Integrated Circuit	U20		43.803003	1	11739202.588727
14S3112400	Integrated Circuit	U11		43.803003	1	11739202.588727
14S3121600	Integrated Circuit	U14	46.1	743.243732	1	691848.860650
14S3524700	Integrated Circuit	U54		43.803003	1	11739202.588727
14S3902500	Integrated Circuit	U33,U41		43.803003	2	6834791.244197
14S4021301	Integrated Circuit	U58		43.803003	1	11739202.588727
14S4033900	Integrated Circuit	U48,U53		43.803003	2	6834791.244197
14S4186600	Integrated Circuit	U52		43.803003	1	11739202.588727
14S4251402	Integrated Circuit	U8		43.803003	1	11739202.588727
14S5A00802	Integrated Circuit	U37,U38		43.803003	2	6834791.244197
14S5A00821	Integrated Circuit	U3,U46,U56		43.803003	3	4923240.069161
14S5A30601	Integrated Circuit	U1,U2,U32		43.803003	3	4923240.069161
14S5A73200	Integrated Circuit	U40,U44		43.803003	2	6834791.244197
14S6206403	Integrated Circuit			43.803003	1	11739202.588727
14S9108500	Integrated Circuit	U34,U39		43.803003	2	6834791.244197
14S9346000	Integrated Circuit	U18		43.803003	1	11739202.588727
16515A2994	Connection	DIMM1	48.4	133.412951	1	4329155.359016
1652205101	Connection	CN23,CN24		16.184835	2	20390152.380746
1652503209	Connection	J1		16.184835	1	35685591.360212
1652808200	Connection	CN17,CN4		16.184835	2	20390152.380746
1652811200	Connection	CN26,CN27		16.184835	2	20390152.380746
1653002101	Connection	CN6,CN7,CN8,CN9		16.184835	4	11344857.509064
1653003101	Connection	JP1,JP2,JP3,JP4,JP5,JP6,JP7		16.184835	7	6941176.714407
165300420Q	Connection	CN22		16.184835	1	35685591.360212
1653300107	Connection	JP3(2-3),JP4(2-3)		16.184835	2	20390152.380746
1653300108	Connection	JP5(1-2),JP6(2-3),JP7(2-3)		16.184835	3	14515880.849373
165330010E	Connection	JP1(1-2),JP2(2-3)		16.184835	2	20390152.380746
1654020004	Connection	CN25		16.184835	1	35685591.360212
1654226303	Connection	PCIE1_A1		16.184835	1	35685591.360212
1654226308	Connection	PCIE2_A1		16.184835	1	35685591.360212
1654401935	Connection	CN1		16.184835	1	35685591.360212
165480430A	Connection	USB1,USB2,USB3		16.184835	3	14515880.849373
1654809301	Connection	CN2		16.184835	1	35685591.360212
1654903900	Connection	CN12		16.184835	1	35685591.360212
1655305025	Connection	CN19		16.184835	1	35685591.360212
1655902030	Connection	BAT1	50	141.642126	1	4077638.546321
1655906032	Connection	CN10,CN14		16.184835	2	20390152.380746



**Reliability Prediction  
Summary**

**File Name:** BOXER-6403.rfp  
**Assembly:** System  
**Ref Des:**  
**Description:**

**Failure Rate:** 10626.825587  
**MTBF (hrs):** 94,101  
**Temperature:** 30  
**Environment:** GF, GU - Ground Fixed, Uncontrolled

Part Number	Category	Ref Des	Tem.Rise	Unit Failure Rate	Quantity	MTBF,Unit
1655906033	Connection	CN5		16.184835	1	35685591.360212
1655909031	Connection	CN16		16.184835	1	35685591.360212
1655912032	Connection	CN11		16.184835	1	35685591.360212
175011901C	Miscellaneous	BAT1-CR1		306.000000	1	1681683.006787